

CLAIMS

1. A vulcanizing mold for pneumatic tires, comprising a plurality of mold pieces for forming a tread portion of the tire, wherein said mold pieces can be assembled with each other side by side in a circumferential direction of the tire:
 - 5 said mold pieces each comprising a molding surface for forming a tread pattern of the tire tread portion, and end surfaces on both sides of the molding surface as seen in the circumferential direction of the tire, where adjacent mold pieces are in abutment with each other when they are assembled, said end surfaces of the mold piece each including an edge region situated adjacent to the molding surface to extend in a width direction of the tread portion;
 - 10 said mold pieces each comprising (i) a first vent means comprised of a narrow gap formed by continuously removing said edge region over substantially entire width of the tread portion, said first vent means being in communication with atmosphere, and (ii) a second vent means comprised of fine unevenness on the molding surface of the mold piece, said second vent means being in communication with said first vent means.
2. A vulcanizing mold according to claim 1, wherein said second vent means is comprised of narrow grooves, which are provided on the molding surface of the mold piece in a region corresponding to a land of the tread portion, said narrow grooves extending substantially continuously in the circumferential direction of the tire.
3. A vulcanizing mold according to claim 2, wherein each of said grooves has a width within a range of 0.1 mm to 0.3 mm and a depth within a range of 0.1 mm to 0.3 mm.
- 25 4. A vulcanizing mold of claim 1, wherein said second vent means is comprised of an air passage along a root portion of a narrow rib, which is provided on the molding surface of the mold piece in a region corresponding to a land of the tread portion, said ribs extending substantially continuously in the circumferential direction of the tire.
- 30 5. A vulcanizing mold according to claim 4, wherein each of said ribs has a width of not greater than 0.3 mm and a height within a range of 0.1 mm to 0.3 mm.
6. A vulcanizing mold according to claim 1, wherein said second vent

means is comprised of a plurality of narrow grooves and at least one other groove intersecting said narrow grooves at not less than one point of each of them, said narrow grooves and said at least one other groove being formed in the molding surface of the mold piece in a region corresponding to a land of the tread portion.

5 7. A vulcanizing mold according to claim 6, wherein each of said grooves has a width within a range of 0.1 mm to 0.3 mm and a depth within a range of 0.1 mm to 0.3 mm.

10 8. A vulcanizing mold according to claim 1, wherein said second vent means is comprised of recesses that are in communication with each other, said recesses being formed by a surface treatment of said molding surface, at a region corresponding to a land in the tread portion, to have a surface roughness within a range of 20 μm to 60 μm .

15 9. A vulcanizing mold according to claim 1, wherein said narrow gap of said first vent means has a width within a range of 0.005 mm to 0.1 mm.

10 10. A vulcanizing mold according to claim 1, wherein said first vent means is further comprised of a groove formed in each of said end surfaces at a location spaced from said molding surface, said groove being wider than said narrow gap and in communication with said narrow gap and atmosphere.

20 11. A vulcanizing mold according to claim 1, wherein said narrow gap comprised in said first vent means extends along that portion of said molding surface, which corresponds to a land in the tread portion.

12. A vulcanizing mold for pneumatic tires, comprising a plurality of mold pieces for forming a tread portion of the tire, wherein said mold pieces can be 25 assembled with each other side by side in a circumferential direction of the tire:

20 said mold pieces each comprising a molding surface for forming a tread pattern of the tire tread portion, and end surfaces on both sides of the molding surface as seen in the circumferential direction of the tire, where adjacent mold pieces are in abutment with each other when they are assembled, said end surfaces of the mold piece each including an edge region situated adjacent to the molding surface to extend in a width direction of the tread portion;

30 said mold pieces each comprising (i) a first vent means comprised of a narrow gap formed by continuously removing said edge region over substantially entire

width of the tread portion, said first vent means being in communication with atmosphere, and (ii) a second vent means comprised of one or more fine apertures, said second vent means being formed in the molding surface of the mold piece at a region corresponding to a land in the tread portion and isolated from said first vent means, said second vent means also being in communication with atmosphere.

5 13. A vulcanizing mold according to claim 12, wherein said fine apertures are formed in an air-permeable, sintered plate member.

10 14. A vulcanizing mold according to claim 13, wherein said sintered plate member has a filtration rating within a range of 5 μm to 40 μm .

15 15. A vulcanizing mold according to claim 12, wherein said fine aperture is formed of a narrow clearance extending at least partly around an insert member inserted into the mold piece and having a tip end surface that forms part of said molding surface.

16. A vulcanizing mold according to claim 15, wherein said narrow clearance has a width within a range of 0.02 mm to 0.1 mm and a depth within a range of 0.1 mm to 2 mm.

20 17. A vulcanizing mold according to claim 12, wherein said fine aperture comprises a slit-like aperture in a top surface of a tubular pin member, said tubular pin member being inserted into the mold piece so that the top surface forms part of the molding surface.

18. A vulcanizing mold according to claim 17, wherein said slit-like aperture has a width within a range of 0.02 mm to 0.1 mm, and a depth within a range of 0.1 mm to 2 mm.

25 19. A vulcanizing mold according to claim 12, wherein said narrow gap comprised in said first vent means has a width within a range of 0.005 mm to 0.1 mm.

20 20. A vulcanizing mold according to claim 12, wherein said first vent means is further comprised of a groove formed in each of said end surfaces at a location spaced from said molding surface, said groove being wider than said narrow gap and in communication with said narrow gap and atmosphere.

30 21. A vulcanizing mold according to claim 12, wherein said narrow gap comprised in said first vent means extends along that portion of said molding surface, which corresponds to a land in the tread portion.